

POLY-PLUS Liquid Additive Withstands Stress, Cuts Costs in Iron Ore Drilling Program

Customer replaces two competing products with one, saves USD 8,320 in four-rig program onshore Mexico

CHALLENGE

Save costs while maintaining high-quality performance in iron ore drilling program onshore Mexico.

SOLUTION

Use POLY-PLUS[†] high-molecular-weight anionic liquid additive to achieve required drilling parameters and reduce expenses.

RESULTS

- Performed as required in place of two-product mixture.
- Reduced costs by 37.55% per wellbore.
- Saved USD 8,320 on four-rig program.



Deploy cost-effective solution for iron ore drilling program

A customer had long engaged in mixing two products to maintain adequate viscosity and to meet stress parameters during its iron ore drilling operations. Drilling requirements included a Marsh funnel viscosity greater than 40 s/quart, plastic viscosity not to exceed 5 cP, a yield point greater than 2 lbf/100 ft², and water hardness not to exceed 150 ppm. Although good viscosity was initially obtained when the two products were mixed, the system degraded after being submitted to stress while drilling. The customer sought to substitute a single product for the two while maintaining required properties under stresses that included drilling through hard rock with clay fracture zones. A mud able to inhibit and encapsulate the clay was needed.

Use POLY-PLUS additive to maintain required viscosity, reduce drilling costs

M-I SWACO recommended the use of the single-product POLY-PLUS additive. The inhibitive polymer POLY-PLUS additive and its variant dry form, POLY-PLUS LV[†] low-viscosity partially hydrolyzed polyacrylamide additive, are designed to control swelling clays and inhibit clay hydration.

Cut costs 37.55% per wellbore, save USD 8,320 on four-rig program

Not only did POLY-PLUS additive resist drilling stress as required at less cost, but the mud was reusable without additional products. Spending for the conventional mixes was approximately USD 277 per shift at a per-meter cost of USD 13.85 on each 1,312-ft [400-m] bore. While using the POLY-PLUS additive, the cost per shift was reduced to USD 173 USD, or USD 8.65 per drilled meter. Total cost savings was 37.55%, or USD 2,080, for each bore. Savings for all four rigs totaled USD 8,320.

	Two-Product Mix (Liquid & Powder) [†]			POLY-PLUS Additive [†]		
	Mud Pit	Return	Difference	Mud Pit	Return	Difference
Marsh funnel viscosity, s/quart	46	33	-13	47	42	-5
Theta 600	5	4	-1	7	6	-1
Theta 300	3	2	-1	5	4	-1
Apparent viscosity, cP	2.5	2.0	-0.5	3.5	3.0	-0.5
Plastic viscosity, cP	2	2	No change	2	2	No change
Yield point, lbf/100 ft ²	1	0	-1	3	2	-1
pH	9.5	9.5	No change	9.0	9.0	No change

[†] 0.26 galUS + 2.20 lbm per 6.29 bbl of water [1 L + 1 kg per m³ of water]

Overall mud properties for the conventional mix upon arrival were good, but properties at the return were below expectations. Properties at the mud pit were similar to those of the traditional two-product mixture, but properties at the return were superior with POLY-PLUS additive, which was able to resist drilling stress.